

*Plate at p. 272*

## THE NATURALIST.

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### MAN.

(Continued from page 231.)

**STRENGTH.** It is difficult to form any satisfactory comparison between the strength of man and of other animals. The health, and many other causes, have such effect on the vital powers of the muscles, that it is hardly possible to perform experiments under circumstances in all respects similar. Desaguliers tells us, that by means of a certain harness, by which every part of a man's body was proportionably loaded, the person employed in the experiment could support, in the erect posture, a weight not less than 2000 pounds. A horse, which is about six times the size of an ordinary man, ought therefore, when managed in the same manner, to bear 12 or 14,000 pounds—a much greater weight than that animal can support, even when it is distributed with every possible advantage.

The mode in which a man can exert the greatest active strength, is in pulling upwards from his feet, because the strong muscles of the back as well as those of the upper and lower extremities, are then brought advantageously into action, and the bones are favorably situated by the fulcra of the levers being near to the resistance. Hence the action of rowing is one of the most advantageous modes of muscular exertion, and no method which has been devised for propelling boats by the labor of men, has hitherto superseded it.

In the operation of turning a crank, a man's power changes in every part of the circle which the handle describes. It is greatest when he pulls the handle upward from the height of

his knees, next greatest when he pushes it down on the opposite side, though here the power cannot exceed the weight of his body, and is therefore less than can be exerted in pulling upward. The weakest points are at the top and bottom of the circle, when the handle is pushed or drawn horizontally.

According to Mr. Buchanan, the comparative effect produced by different modes of applying the force of a man is nearly as follows. In the action of turning a crank, his force may be represented by the number seventeen. In working at a pump by twenty-nine. In pulling downward, as the action of ringing a bell, by thirty-nine. And in pulling upward from the feet, as in rowing, by forty-one.

The strength of animals may also be estimated by agility, and perseverance in labor. Men, when accustomed to running, are able to outstrip horses in the long run : a man will accomplish a long journey sooner, and be less fatigued, than the best road horses. The royal messengers of Ispahan, who are trained to running, go 36 leagues in 14 or 15 hours ; we are assured by travellers, that the Hottentots outrun lions in the chase ; and that those savages who live by hunting, pursue and even catch deer, and other animals of equal swiftness. If we except birds, whose muscles are proportionably stronger than those of any other animals, no creature could support such long continued fatigue as man.

The Spaniards in their first intercourse with the New World found the natives in general much feebler than themselves ; and the inability of the former to sustain the severe labor of the mines, led to the introduction of African slaves, one of whom was equal to three or four Indians. In engagements between troop and troop, or man and man, the Virginians and Kentuckians have always shown themselves stronger than the American savages. Hearne, Mackenzie, Perouse, Lewis, Clarke and others, have found the same inferiority of physical force in various parts of the North American continent.

The testimony of Pallas respecting the Mongolian tribe of the Burats is very remarkable—'Their appearance is generally effeminate ; and they are mostly so small in stature and weak, that five or six Burats are often unable to effect what a single Russian can accomplish. This want of power is not the only circumstance which proves, in the Burats and other Siberian nomadic people, that a mere animal diet is unnatural and incapable of maintaining in perfection the physical prerogatives of our species. The body in all these people is remarkably light in comparison to its size. You can raise

and hold up the children with one hand, when those of the Russian boors of the same age could only be lifted with both. Even adult Burats compared to the Russians, are astonishingly light; so that the horses, which are not indeed powerful, when tired by a Russian rider, recover themselves if a Burat takes his place.'

In order to procure some exact comparative results on this point, Peron took with him on his voyage an instrument called a dynamomètre, so constructed as to indicate, on a dial-plate, the relative force of individuals submitted to experiment. He directed his attention to the strength of the arms and of the loins, making trial with several individuals of each kind, viz: twelve natives of Van Diemen's Land, seventeen of New Holland, fifty-six of the island of Timor, seventeen Frenchmen belonging to the expedition, and fourteen Englishmen in the colony of New South Wales. The following numbers express the mean result in each case; but the details are all given in a tabular form in the original.

	STRENGTH	
	of the Arms. Kilogrammes.	of the Loins. Myriagrammes.
1. Van Diemen's Land, . . . . .	50.6	
2. New Holland, . . . . .	50.8	10.2
3. Timor, . . . . .	58.7	11.6
4. French, . . . . .	69.2	15.2
5. English, . . . . .	71.4	16.3

The highest numbers in the first and second class were respectively, 60 and 62; the lowest in the English trial, 63, and the highest 83, for the strength of the arms. In the power of the loins, the highest among the New Hollanders was 13, the lowest of English 12.7, and the highest 21.3.

These results offer the best answer to the declamations on the degeneracy of civilized man. The attribute of superior physical strength, so boldly assumed by the eulogists of the savage state, has never been questioned or doubted. Although we have been consoled for this supposed inferiority by an enumeration of the many precious benefits derived from civilization, it has always been felt as a somewhat degrading disadvantage. Bodily strength is a concomitant of good health, which is produced and supported by a regular supply of wholesome and nutritious food, and by active occupation. The industrious and well-fed middle classes of a civilized community may therefore be reasonably expected to surpass, in this endowment, the miserable savages, who are never well-fed, and too frequently depressed by absolute want and all other privations.

## THE HORSE.

GRAND DIVISION—*Vertebralia*, possessing a vertebral column or spine.

CLASS—*Mammalia*, nourishing the young by milk. ORDER—*Pachyderma*, having a thick skin. GENUS—*Equus*, comprising horses. SPECIES—*Caballus*, tail uniformly covered with long hair.

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THE reduction of the horse to a domesticated state, is the greatest acquisition from the animal world which was ever made by the art and industry of man. This noble animal partakes of the fatigues of war, and seems to feel the glory of victory. Equally intrepid as his master, he encounters danger and death with ardor and magnanimity. He delights in the noise and tumult of arms, and annoys the enemy with resolution and alacrity. But it is not in perils and conflicts alone that the horse willingly co-operates with his master; he likewise participates of human pleasures. He exults in the chase and the tournament; his eyes sparkle with emulation in the course. But though bold and intrepid, he suffers not himself to be carried off by a furious ardor; he represses his movements, and knows how to govern and check the natural vivacity and fire of his temper. He not only yields to the hand, but seems to consult the inclination of his rider. Uniformly obedient to the impressions he receives, he flies or stops, and regulates his motions entirely by the will of his master. He in some measure renounces his very existence to the pleasures of man. He delivers up his whole powers; he reserves nothing, and often dies rather than disobey the mandates of his governor.

These are features in the character of the horse, whose natural qualities have been matured by art, and trained with care to the service of man. His education commences with the loss of liberty, and is completed by restraint. When employed in labor, he is always covered with the harness; and even during the time destined for repose, he is never entirely delivered from bonds. If sometimes permitted to roam in the pasture, he always bears the marks of servitude, and often the external impressions of labor and pain. His mouth is deformed by the perpetual friction of the bit; his sides are galled with wounds, or furrowed with cicatrices; and his hoofs are pierced with nails. The natural gestures of his body are constrained by the habitual pressure of fetters

from which it would be in vain to deliver him ; for he would not be more at liberty. Those horses, the servitude of which is most mild, which are kept solely for the purposes of luxury and magnificence, and whose golden chains only gratify the vanity of their masters, are more dishonored by the elegance of their trappings, and by the plaits of their hair, than by the iron shoes on their feet.

Art is always excelled by nature ; and in animated beings, liberty of movement constitutes the perfection of their existence. Examine those horses which have multiplied so prodigiously in South America, and live in perfect freedom. Their motions are neither constrained nor measured. Proud of their independence, they fly from the presence of man, and disdain all his care. They search for, and procure the food that is most salutary and agreeable. They wander and frisk about in immense meadows, and collect the fresh productions of a perpetual spring. Without any fixed habitation, or other shelter than a serene sky, they breathe a purer air than in those musty vaults in which we confine them, when subject to our dominion. Hence wild horses are stronger, lighter, and more nervous than most of those which are in a domestic state. The former possess force and dignity, which are the gifts of nature ; the latter have only address and gracefulness, which are all art can bestow.

These wild horses are by no means ferocious in their temper ; they are only wild and fiery. Though of strength superior to most animals, they never make an attack ; but when assaulted, they either disdain the enemy, bounce out of his way, or strike him dead with their heels. They associate in troops from no other motive than the pleasure of being together ; for they have no fear ; but acquire a mutual attachment for each other. As vegetables constitute their food, of which they have enough to satisfy their appetites, and, as they are not carnivorous, they neither make war with other animals, nor among themselves. They dispute not about their common nourishment, and never have occasion to snatch prey from each other—the general source of quarrels and combats among the rapacious tribes. Hence they live in perpetual peace, because their appetites are simple and moderate, and they have no objects to excite envy.

All these features are apparent in young horses bred together in troops. Their manners are gentle, and their tempers social ; their force and ardor are generally rendered conspicuous by marks of emulation. They anxiously press to be foremost in the course, to brave danger in traversing a

river, or in leaping a ditch or precipice ; and it has been remarked, that those which are most adventurous and expert in these natural exercises, are the most generous, mild and tractable, when reduced to a domestic state.

The native country of the horse cannot with certainty be traced. He has been found, varying materially in size, in form and in utility, in all the temperate, in most of the sultry, and many of the northern regions of the old world.

Troops of wild horses are found in the plains of Great Tartary, and also in several parts of South America. In neither, however, can we recognize an original race. The horses of the Ukraine, and those of South America, are equally the descendants of those who had escaped from the slavery of man. The Tartar horses are fleet and strong, but comparatively of an ordinary breed. Those of South America retain, almost unimpaired, the size and form of their European ancestors.

In no part of America, or of the more newly discovered islands of the Pacific, was the horse known, until he was introduced by Europeans ; and the origin of the horses of Tartary has been clearly traced to those who were employed in the siege of Azoph, in 1657, but which were turned loose for want of forage.

All travellers who have crossed the plains extending from the shores of La Plata to Patagonia, have spoken of numerous droves of wild horses. Some affirm that they have seen ten thousand in one troop. They appear to be under the command of a leader, the strongest and boldest of the herd, and whom they implicitly obey. A secret instinct teaches them that their safety consists in their union, and in a principle of subordination. The lion, the tiger and the leopard, are their principal enemies. At some signal, intelligible to them all, they either close into a dense mass, and trample their enemy to death ; or, placing the mares and foals in the centre, they form themselves into a circle, and welcome him with their heels. In the attack, their leader is the first to face the danger, and, when prudence demands a retreat, they follow his rapid flight.

In the thinly inhabited parts of South America it is dangerous to fall in with any of these troops. The wild horses approach as near as they dare ; they call to the loaded horse with the greatest eagerness, and, if the rider be not on the alert, and have not considerable strength of arm, and sharpness of spur, his beast will divest himself of his burden, take to his heels, and be gone forever.

The wild horses of Tartary, although easily domesticated,

materially differ in character from those on the plains of South America. They will not suffer a stranger to join them. If a domesticated horse comes in their way, unprotected by his master, they attack him with their teeth and their heels, and speedily destroy him. They readily submit, however, to the dominion of man, and become perfectly docile and faithful.

Among the Tartars the flesh of the horse is a frequent article of food; and although they do not, like the Indians of the Pampas, eat it raw, their mode of cookery would not be very inviting to the European epicure. They cut the muscular parts into slices, and place them under their saddles, and after they have galloped thirty or forty miles, the meat becomes tender and sodden, and fit for their table; and, at all their feasts, the first and last and most favorite dish, is a horse's head.

When water was not at hand, the Scythians used to draw blood from their horses, and drink it; and the dukes of Muscovy, for nearly two hundred and sixty years, presented Tartar ambassadors with the milk of mares. If any of this milk fell upon the mane of the horse, the duke, by custom, was bound to lick it off.

Troops of wild horses are occasionally met with in the central parts of Africa, in the island of St. Domingo, on the deserts of Arabia, and in a few other parts of the world; but no where do they equal the domesticated horse in form, strength, or even in speed!

The varieties of the horse are so numerous, that it would be impossible for us, within our limits, to present a complete history of them all. But as the English horse is the most useful as well as the most common throughout the civilized world, its history eminently deserves our attention, which we next proceed to detail.

The earliest record of the horse in Great Britain is contained in the history given by Julius Cæsar of his invasion of that island. The British army was accompanied by numerous war chariots drawn by horses. Short scythes were fastened to the ends of the axletrees, sweeping down everything before them, and carrying terror and devastation into the ranks of their enemies. The conqueror gives a most animated description of the dexterity with which the horses were managed.

What kind of horse the Britons then possessed, it would be useless to inquire; but, from the cumbrous structure of the car, and the fury with which it was driven, and from the badness or non-existence of the roads, they must have been both active and powerful in an extraordinary degree. Cæsar deem-



ed them so valuable, that he carried many of them to Rome ; and the British horses were, for a considerable period afterwards, in great request in various parts of the Roman empire.

Horses must at that time have been exceedingly numerous in Britain, for we are told that when the British king, Cassibellaunus, dismissed the main body of his army, he retained four thousand of his war chariots for the purpose of harassing the Romans, when they attempted to forage.

The British horse now received its first cross : but whether the breed was thereby improved, cannot be ascertained. The Romans having established themselves in Britain, found it necessary to send over a numerous body of cavalry to maintain a chain of posts, and check the frequent insurrections of the natives. The Roman horses would breed with those of the country, and, to a greater or less extent, change their character ; and from this time, the English horse would consist of a compound of the native and those from Gaul, Italy, Spain, and every province from which the Roman cavalry was supplied. Many centuries afterwards passed by, and we have no record of the character or value, improvement or deterioration of the animal.

It would appear probable, however, that Athelstan, the natural son of Alfred the Great, and the second in succession to him, paid some attention to the improvement of the horse ; for having subdued all the rebellious portions of the Heptarchy, he was congratulated on his success by some of the continental princes, and received from Hugh Capet of France, who solicited his sister in marriage, various presents, doubtless of a nature that would be thought most acceptable to him ; and among them several German *running horses*. Hence this breed received another cross, and probably an improvement.

Athelstan seems to have seriously devoted himself to this important object, for he soon afterwards decreed (in 930) that no horses should be sent abroad for sale, or on any account, except as royal presents. This proves his anxiety to preserve the breed, and likewise renders it probable that that breed was beginning to be esteemed by their neighbors. In a document bearing date 1000, we have an interesting account of the relative value of the horse. If a horse was destroyed, or negligently lost, the compensation to be demanded was thirty shillings ; a mare or colt, twenty shillings ; a mule or young ass, twelve shillings ; an ox, thirty pence ; a cow, twenty-four pence ; a pig, eight pence ; and it strangely follows, a man, one pound.



In the laws of Howell the Good, prince of Wales, and passed a little before this time, there are some curious particulars respecting the value and sale of horses. The value of a foal not fourteen days old, is fixed at four pence; at one year and a day it is estimated at forty-eight pence; and at three years sixty pence. It was then to be tamed with the bridle, and brought up either as a *palfrey* or a *serving horse*; when its value became one hundred and twenty pence; and that of a *wild* or unbroken mare, sixty pence.

Even in those early days, the frauds of dealers were too notorious, and the following singular regulations were established. The buyer was allowed time to ascertain whether the horse were free from three diseases. He had three nights to prove him for the staggers; three months to prove the soundness of his lungs; and one year to ascertain whether he were infected with glanders. For every blemish discovered after the purchase, one-third of the money was to be returned, except it should be a blemish of the ears or tail.

The practice of letting horses for hire was then known, and then, as now, the services of the poor hack were too brutally exacted. The benevolent Howell disdains not to legislate for the protection of this abused and valuable servant.—‘Whoever shall borrow a horse, and rub the hair so as to gall the back, shall pay four pence; if the skin is forced into the flesh, eight pence; if the flesh be forced to the bone, sixteen pence.’

One circumstance deserves to be remarked, that in none of the earliest historical records of the Anglo-Saxons or the Welsh, is there any allusion to the use of the horse for the plough. Until a comparatively recent period, oxen alone were used in England, as in other countries, for this purpose; but about this time (the latter part of the tenth century) some innovation on this point was creeping in, and, therefore, a Welsh law forbids the farmer to plough with horses, mares, or cows, but with oxen alone. On one of the pieces of tapestry woven at Bayonne in the time of William the Conqueror, (1066) there is the figure of a man driving a horse attached to a harrow. This is the earliest notice we have of the use of the horse in field labor.

With William the Conqueror came a marked improvement in the British horse. To his superiority in cavalry, this prince was chiefly indebted for the victory of Hastings. The favorite charger of William was a Spaniard. His followers, both the barons and common soldiers, came principally from a

country in which agriculture had made more rapid progress than in England. A very considerable portion of the kingdom was divided among these men; and it cannot be doubted that, however unjust was the usurpation of the Norman, England benefited in its husbandry, and particularly in its horses, by the change of masters. Some of the barons, and particularly Roger de Boulogne, earl of Shrewsbury, introduced the Spanish horse on their newly-acquired estates. The historians of these times, however, principally monks, knowing nothing about horses, give us very little information on the subject.

In the reign of Henry I. (1121) the first Arabian horse, or at least, the first on record, was introduced. Alexander I., king of Scotland, presented to the church of St. Andrews an Arabian horse, with costly furniture, Turkish armor, many valuable trinkets, and a considerable estate.

Forty years afterwards, in the reign of Henry II., Smithfield was celebrated as a horse market. Fitz-Stephen, who lived at that time, gives the following animated account of the manner in which the *hackneys* and *charging steeds* were tried there, by racing against one another:—'When a race is to be run by this sort of horses and perhaps by others, which also in their kind are strong and fleet, a shout is immediately raised, and the common horses are ordered to withdraw out of the way. Three jockeys, or sometimes only two, as the match is made, prepare themselves for the contest. The horses on their part are not without emulation; they tremble and are impatient, and are continually in motion. At last the signal once given, they start, devour the course, and hurry along with unremitting swiftness. The jockeys, inspired with the thought of applause, and the hope of victory, clap spurs to their willing horses, brandish their whips, and cheer them with their cries.' This description reminds us of the more lengthened races of the present day, and proves the blood of the English horse, even before the Eastern breed was tried.

Close on this followed the Crusades. The champions of the Cross certainly had it in their power to enrich their native country with some of the choicest specimens of Eastern horses, but they were completely under the influence of superstition and fanaticism, and common sense and usefulness were forgotten.

An old metrical romance, however, records the excellence of two horses belonging to Richard Cœur de Lion, which he purchased at Cyprus, and were therefore probably of Eastern origin.

Yn this worlde they hadde no pere,\*  
 Dromedary no destrere,†  
 Stede, Rabyte,‡ ne Cammele,  
 Goeth none so swifte, without fayle;  
 For a thousand pownd of golde,  
 Ne should the one be solde.

The war steed was defended by mail or plate, much on the plan of the harness of the knight himself. His head was ornamented with a crest. The head, chest and flanks were wholly or partially protected; and sometimes he was clad in complete steel, with the arms of his master engraved or embossed on his *bardings*. The bridle of the horse was always as splendid as the circumstances of the knight allowed, and thus a horse was often called *Brigliadore*, from *briglia d'oro*, a bridle of gold. Bells were a very favorite addition to the equipment of the horse. The old Troubadour, Arnold of Marson, says, that 'nothing is so proper to inspire confidence in a knight, and terror in an enemy.'

The price of horses at this period was singularly uncertain. In 1185, fifteen breeding mares sold for two pounds twelve shillings and six pence. They were purchased by the monarch, and distributed among his tenants, and, in order to get something by the bargain, he charged them the great sum of four shillings each. Twenty years afterwards, ten capital horses brought no less than twenty pounds each; and, twelve years later, a pair of horses were imported from Lombardy, for which the extravagant price of thirty-eight pounds thirteen shillings and four pence was given. The usual price of good handsome horses was ten pounds, and the hire of a car or cart, with two horses, was ten pence a day.

To king John, hateful as he was in all other respects, we are yet much indebted for the attention which he paid to agriculture generally, and particularly to improving the breed of horses. He imported one hundred chosen stallions of the Flanders kind, and thus mainly contributed to prepare our noble species of draught horses as unrivalled as the horses of the turf.

John accumulated a very numerous and valuable stud. He was eager to possess himself of every horse of more than usual power; and, at all times, gladly received from the tenants of the crown, horses of a superior quality, instead of money, for the renewal of grants, or the payment of forfeitures belonging to the crown. It was his pride to render his cavalry, and the horses for the tournament and for pleasure, as perfect as pos-

\* Peer, equal.

† War horse.

‡ Arabian.

sible. It could not be expected that so haughty a tyrant would concern himself much with the inferior kinds; yet while the superior was becoming rapidly more valuable, the others would, in an indirect manner, partake of the improvement.

One hundred years afterwards, Edward II. purchased thirty Lombardy *war horses*, and twelve heavy draught horses. Lombardy, Italy and Spain were the countries whence the greater part of Europe was then supplied with the most valuable cavalry or parade horses. Horses for agricultural purposes were chiefly procured from Flanders.

Edward III. devoted one thousand marks to the purchase of fifty Spanish horses; and of such importance did he conceive this addition to the English, or rather mingled blood, then existing, that formal application was made to the kings of France and Spain to grant safe conduct to the troop. When they had safely arrived at the royal stud, it was computed that they had cost the monarch no less than thirteen pounds six shillings and eight pence per horse, equal in value to one hundred and sixty pounds English currency.

This monarch had many *running horses*. The precise meaning of the term is not, however, clear. It might be light and speedy horses, in opposition to the war horse, or those that were literally used for the purpose of racing. The average price of these running horses was twenty marks, or three pounds six shillings and eight pence. Edward was devoted to the sports of the turf or the field, or he began to see the propriety of crossing their stately and heavy breed with those of a lighter structure and greater speed.

There was, however, one impediment to this, which was not for a very long period removed. The soldier was cased in heavy armor. The knight with all his accoutrements, often weighed more than twenty-five stone. No little bulk and strength were required in the animal destined to carry the back-breaking weight. When the musket was substituted for the cross-bow and battle-axe, and this iron defence, cumbrous to the wearer, and destructive to the horse, was useless, and laid aside, the improvement of the British horse in reality commenced.

While Edward was thus eager to avail himself of foreign blood, with the too frequent selfishness of the sportsman, he would let no neighbor share in the advantage. The exportation of horses was forbidden under very heavy penalties. One case in which he relaxed from his severity is mentioned, when he permitted a German merchant to re-export some Flemish horses which he had bought on speculation; but he was

strictly forbidden to send them to Scotland. Nay, so jealous were these sister kingdoms of each other's prosperity, that so late as the time of Elizabeth, it was felony to export horses from England to Scotland.

The English horse was advancing, although slowly, to an equality with, or even superiority over those of neighboring countries. His value began to be more generally and highly estimated, and his price rapidly increased—so much so, that breeders and the dealers, then, as now, skilful in imposing on the inexperienced, obtained from many of their young ganders enormous prices for them. This evil magnified to such an extent, that Richard II. (1386) interfered to regulate and determine the price. The proclamation which he issued is interesting, not only as proving the increased value of the horse, but showing what were, four hundred and fifty years ago, and what are still, the chief breeding districts. It was ordered to be published in the counties of Lincoln and Cambridge, and the East and North Ridings of Yorkshire; and the price of the horse was restricted to that which had been determined by former sovereigns. A more enlightened policy has at length banished all such absurd interferences with agriculture and commerce.

We can now collect but little of the history of the horse until the reign of Henry VII., at the close of the fifteenth century. He continued to prohibit the exportation of stallions, but allowed that of mares when more than two years old, and under the value of six shillings and eight pence.

The reign of Henry VIII. produced the earliest English treatise on agriculture, and the management of horses and cattle. It was written by Sir A. Fitzherbert, Judge of Common Pleas, and contains much useful information. It is entitled, '*Boke of Husbandry*;' and, being now exceedingly rare, an extract from it may not be unacceptable. It would seem that the mare had been but lately employed in husbandry, for he says, 'A husbände may not be without horses and mares, and specially if he goe with a horse-ploughe he must have both, his horses to draive; his mares to brynge colts to upholde his stock, and yet at many times they may draive well if they be well handled.' The learned judge shared the common fate of those who have to do with the horse.—'Thou grasyer, thou mayst fortune to be of myne opinion or condytion to love horses, and young coltes and foles to go among thy cattle, take hede that thou be not beguiled as I have been a hundred tymes and more. And first thou shalt knowe that a good horse has fifty-four properties, that is to say, two of a

man, two of a badger, four of a lion, nine of an ox, nine of a hare, nine of a fox, nine of an ass, and ten of a woman.\*

The tyrannical edicts of Henry VIII. had the effect which common sense would have anticipated—the breed of horses was not materially improved, and their numbers were sadly diminished. When the bigot, Philip of Spain, threatened England, in the reign of Elizabeth, with his Invincible Armada, that princess could muster, in her whole kingdom, only three thousand cavalry to oppose him; and Blundeville, who wrote at this time a very pleasant and excellent book on the art of riding, speaks contemptuously of the qualities of these horses. The secret of improving the breed had not then been discovered; it had been attempted by arbitrary power; and it had extended only to those crosses from which little good could have been expected: or, rather, it had more reference to the actual situation of the country, the heavy carriages, the bad roads, and the tedious travelling which then prevailed, than to the wonderful change in these which a few centuries were destined to effect.

Blundeville describes the majority of the English horses as consisting of strong, sturdy beasts, fit only for slow draught, and the few of a lighter structure being weak and without bottom. There were, however, some exceptions; for he relates a case of one of these lighter horses travelling eighty miles in a day—a task which in later times has been too often and cruelly exacted from the half-bred English nags.

An account has been given of the racing trial of the horses in Smithfield market. Regular races were now established in various parts of England. Meetings of this kind were first held at Chester and Stamford; but there was no acknowledged system as now; and no breed of racing horses. Hunters and hackneys mingled together, and no description of horse was excluded.

There was at first no course marked out for the race, but the contest generally consisted in the running of *train-scent* across the country, and sometimes the most difficult and dan-

\*Late writers have pirated from Sir A. but have not improved upon him. The following description of the horse is well known. 'A good horse should have three qualities of a woman—a broad breast, round hips and a long mane;—three of a lion—countenance, courage and fire;—three of a bullock—the eye, the nostril and joints;—three of a sheep—the nose, gentleness and patience;—three of the mule—strength, constancy and foot;—three of a deer—head, legs and short hair;—three of a wolf—throat, neck and hearing;—three of a fox—ear, tail and trot;—three of a serpent—memory, sight and turning;—and three of a hare or cat—running, walking and suppleness.'



gerous part of the country was selected for the exhibition. Occasionally the present steeple chase was adopted with all its dangers, and more than its present barbarity; for persons were appointed cruelly to flog along the jaded and exhausted horses.

It should, however, be acknowledged that the races of that period were not disgraced by the system of gambling and fraud which seems to have become almost inseparable from the amusements of the turf. The prize was usually a wooden bell adorned with flowers. This was afterwards exchanged for a silver bell, and 'given to him who should run the best and farthest on horseback on Shrove Tuesday.' Hence the common phrase of 'bearing away the bell.'

Horse racing became gradually more cultivated; but it was not until the last year of the reign of James I. that rules were promulgated and generally subscribed to for their regulation. That prince was fond of field sports. He had encouraged, if he did not establish, horse racing in Scotland, and he brought with him to England his predilection for it; but his races were more often matches against time, or trials of speed and bottom, for absurdly and cruelly long distances. His favorite courses were at Croyden and on Enfield Chase.

James, with great judgment, determined to try the Arab breed. Probably he had not forgotten the story of the Arabian, which had been presented to one of his Scottish churches five centuries before. He purchased from a merchant named Markham, a celebrated Arabian horse, for which he gave the extravagant sum of five hundred pounds. Kings, however, like their subjects, are often thwarted and governed by their servants, and the duke of Newcastle took a dislike to this foreign animal. He wrote a book, and a very good one, on horsemanship, and described this Arabian as a little pony horse, of ordinary shape, setting him down as good for nothing, because after being regularly trained, he could not race. The opinion of the duke, probably altogether erroneous, had, for nearly a century, great weight; and the Arabian horse lost its reputation among the English turf breeders.

Charles I. ardently pursued this favorite object of English gentlemen, and, a little before his rupture with the parliament, established races in Hyde Park, and at Newmarket. The civil wars somewhat suspended the improvement of the breed; yet the advantage which was derived by both parties from a light and active cavalry, sufficiently proved the importance of the change which had been effected; and Cromwell perceiving, with his wonted sagacity, how much these pur-

suits were connected with the prosperity of the country, had his stud of race horses.

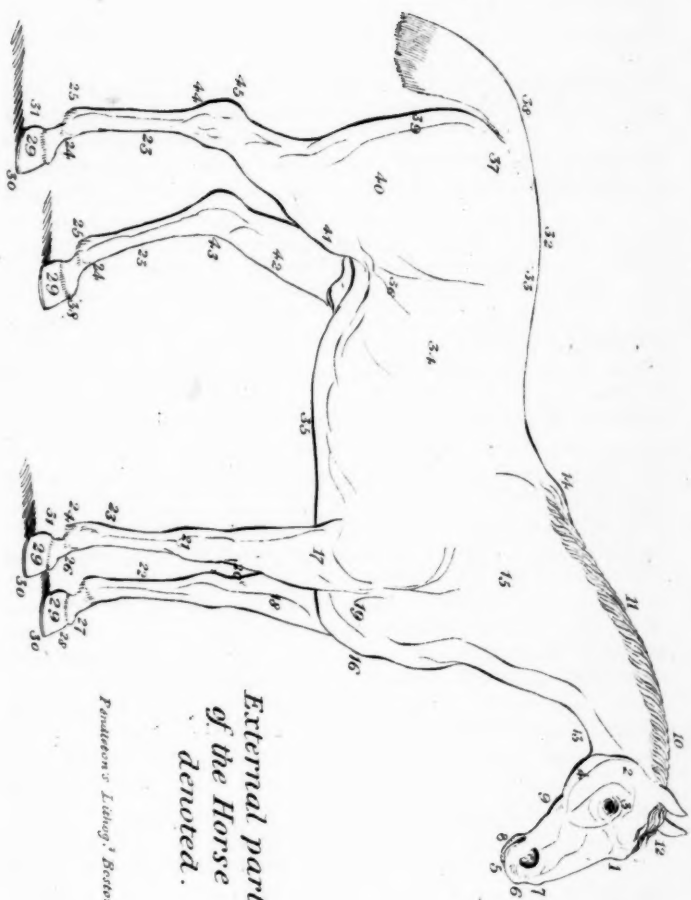
At the Restoration, a new impulse was given to the cultivation of the horse by the inclination of the court to patronize gaiety and dissipation. The races at Newmarket were restored, and as an additional spur to emulation, royal plates were now given at each of the principal courses.

Man is rarely satisfied with any degree of perfection in the object on which he has set his heart. The sportsman had now beauty of form, and speed and stoutness, scarcely an approach to which had been observed in the original breed. Still some imagined that this speed and stoutness might possibly be increased; and Mr. Darley, in the latter part of the reign of Queen Anne, had recourse to the discarded and despised Arabian. He had much prejudice to contend with, and it was some time before the Darley Arabian attracted notice. At length the value of his produce began to be recognized, and to him we are greatly indebted for a breed of horses of unequalled beauty, speed and strength.

This last improvement now furnishes all that can be desired: nor is this true only of the thorough-bred or turf horse: it is, to a very material degree, the case with every description of horse.

We shall here give Buffon's description of what he considers as a perfect horse; but that this and similar descriptions may be better understood, we shall premise an explanation of technical terms commonly employed in describing a horse. The figures, prefixed to the terms, refer to the subjoined plate.

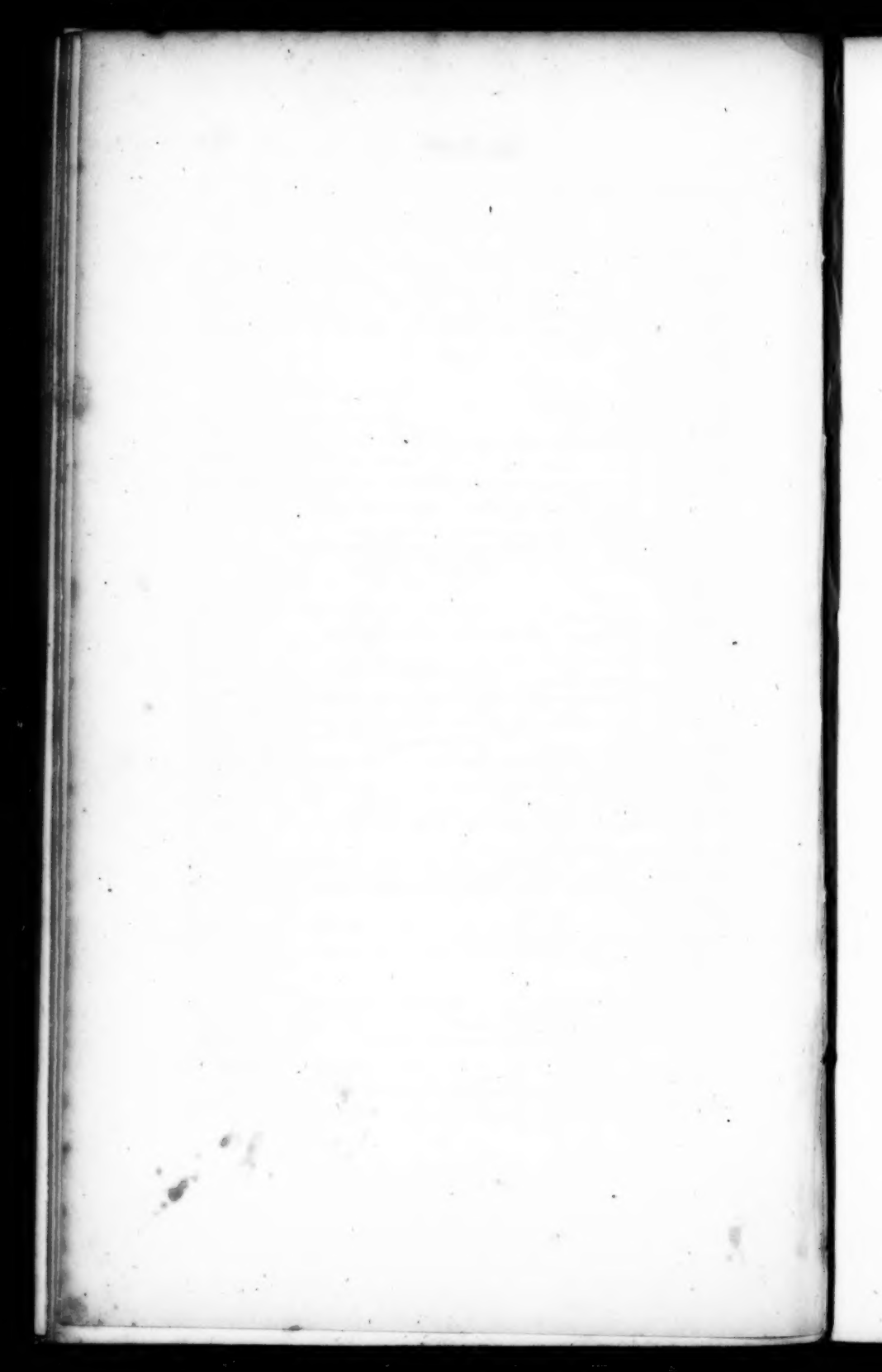
1. The forehead—2. The temples—3. Cavity above the eye—4. The jaw—5. The lips—6. The nostrils—7. The tip of the nose—8. The chin—9. The beard—10. The neck—11. The mane—12. The fore-top—13. The throat—14. The withers—15. The shoulders—16. The chest—17. The elbow—18. The arm—19. The plate vein—20. The chesnut—21. The knee—22. The shank—23. The main tendons—24. The fetlock joint—25. The fetlock—26. The pastern—27. The coronet—28. The hoof—29. The quarters—30. The toes—31. The heel—32. The reins—33. The fillets—34. The ribs—35. The belly—36. The flanks—37. The rump—38. The tail—39. The buttocks—40. The haunches—41. The stifle—42. The thighs—43. The hock—44. The kerb—45. The point of the hock.]



*External parts  
of the Horse  
denoted.*

*Pendleton's Lithog. Boston.*





## THE PEACH.

NATURAL ORDER—*Rosaceae*, resembling the rose in flowers and medicinal properties, being refrigerant, tonic and astringent. CLASS—*Icosandria*, having about twenty stamens situated on the calyx. ORDER—*Monogynia*, having but one pistil. GENUS—*Persica*, comprising peaches.

ALL the ancient authors agree that the peach tree is a native of Persia ; and it appears that the fruit was thought to be of a poisonous nature. It is evident there had been traditional tales of this fruit having been sent into Egypt to poison the inhabitants. Columella says in his tenth book :—

‘And apples, which most barbarous Persia sent,  
With native poison armed (as fame relates):  
But now they ’ve lost their power to kill, and yield  
Ambrosian juice, and have forgot to hurt ;  
And of their country still retain the name.’

Pliny relates that they had been stated to have possessed venomous qualities, and that this fruit was sent into Egypt by the kings of Persia, by way of revenge, to plague the natives ; but he treats this story as a mere fable, adding, that the name of *Persica* evidently bespeaks them a Persian fruit. Cato has not mentioned them ; and Pliny adds, that it was not long since peaches were known in Rome, and there was great difficulty in rearing them. He informs us they were brought from Egypt to the isle of Rhodes, where they could never be made to produce fruit ; and from thence to Italy. He says, moreover, that it was not a common fruit in Greece or in Natolia. This author states again, that he considered it the most harmless fruit in the world ; that it had the most juice with the least smell of any fruit, and yet caused thirst to those who ate of it.

Peaches were evidently cultivated in France at an early period, as Columella continues, in his account of this fruit, by stating—

‘Those of small size to ripen make great haste ;  
Such as great Gaul bestows, observe due time  
And season, not too early, nor too late.’

Pliny says, ‘as for the French and Asiatic, they bear the name of the regions and nations from whence they come.’

It is stated that the peach tree was not cultivated in Eng-

land before the year 1562; and by whom it was introduced, or from what country it was procured we have no authentic account; although Gerard wrote his work soon after, which was published in 1597, wherein he describes the white peach, the red peach, the yellow peach, and the d'avant peach, and adds, 'I have them all in my garden, with many other sorts.'

Of this delicious melting fruit we have a great variety, from the small nutmeg peach which ripens in August, to the Hyslop's fine late peach which ripens in November. The peach has been almost equally multiplied in its varieties with the apple, by sowing the stones, and by the ingenious method of impregnating the blossoms. Mr. Knight, alluded to in our last number, has procured a new peach by this operation: he impregnated the pistil of the blossom of an almond tree, with the pollen of a peach flower; and this almond when planted, produced a peach tree instead of one of its own kind, and has since ripened peaches.

The following list exhibits the names of all the varieties growing in the Kenrick Nurseries in Newton, and the time that they come to maturity:—

Early Anne, Early Red Nutmeg, Early White Nutmeg, Early Double Mountain, Early Probyn, Early Purple, Early York, Cooledge's Favorite Early Red Rareripe, Hane's Early Red, New Sweet Water, August; Diana, Elizabethtown, Grosse Mignonne, vineuse or veloutée de Merlet, Golden Purple, Hand's Pennsylvanian Claret, Morris's Red Rareripe, Morris's White Rareripe, Prince's Red Rareripe, Red Pine Apple, Royale, Royal George, Royal Kensington, Teton de Venus, White Magdalen, August and September; Admirable, Apricot Peach, Bellegarde, gallande or noir de Montreuil, Blood Peach, for preserving, Bourdine, Belle Chevereuse, Buckingham Mignonne, Carolina Kennardy, Chancellor, Chancelliere, Clinton, Columbia, Congress, Double Flowering, Emperor of Russia, serrated leaf, Favorite, George the Fourth, Green Catharine, Imperial Purple, Jaques's Rareripe, Lady Gallatin, Late Purple, Lemon, Malta or Belle de Pario, Meiggs's Lafayette, Mellish's Favorite, Alberge Yellow, Newington, Noblesse, Old Mixon, Orange, Pavie Admirable or Belle de Vitry, Perseque Grosse, President, Red Magdalen, Sargent's Rareripe, Snow Peach or Willow, Swalsh or Vanguard, Vineuse de Fromentin, Washington, White Pine Apple, Yellow Red Rareripe, Yellow and Red Cheek Malacatune, Yellow Apricot, pavie abricote, September; Health Peach, September and October; Monstrous Lemon, October; Hyslop's fine Late, October and November.



It has been frequently remarked, that the finest flavored peaches have been gathered from trees of the greatest age. Peach trees have been known to attain the age of fifty or sixty years, yielding an ample crop, when younger ones fail.

Peach trees grow in abundance on the Mississippi, particularly in Louisiana. As the latitude of that place is the same as that part of Asia of which these trees are the natural production, there can be no doubt but they are indigenous to Louisiana, as well as to Persia; although in this section of the United States the peach is regarded as a foreign fruit, it having been introduced from Europe before Louisiana had been explored.

This fruit is cultivated with such success in many parts of the Union—Virginia and Pennsylvania in particular—that it is not uncommon to see orchards containing one thousand standard peach trees, which are so productive that the fruit is used to fatten swine: from a single orchard have been procured, after the pulp is fermented and distilled, one hundred barrels of peach brandy.

The best peaches of every kind are red on the side next to the sun, and of a yellowish cast towards the wall; the pulp should also be of a yellowish tint, and juicy; the skin thin, and the stone small. To have them in perfection, they should not be gathered until they will fall into the hand by the slightest touch of the finger.

This is one of the fruits in particular which is recommended to be eaten in the morning, in preference to the usual time of desert. Brooks says, 'peaches agree well with persons of hot constitutions and costive habits, especially if they be eaten in a morning fasting.'

The flowers of the peach tree are used in medicine: when made into a sirup they are given as an aperient to children, and are recommended as a great destroyer of worms.

It should be observed not to get the flowers from those peach trees that have been grafted upon almond stocks, as the flowers partake of the property of the stock, which greatly alters their virtue.

The young leaves are used by cooks to flavor blanc-mange, custards, puddings, &c.; and a liquor resembling *noyau* is made by steeping peach leaves in white brandy, and, when sweetened with sugar-candy, and fined with milk, it is difficult to distinguish it from the flavored cordial of Martinique.

From the wood of the peach tree the color called rose pink is procured.

October is the best time for winter pruning, when, with little attention, the blossom buds will be known from the wood buds; the latter being less turgid, longer and narrower, than the blossom buds. In shortening the branches, observe to leave a wood bud at the end instead of the fruit bud. Care should be taken to nip off the ends of the strong shoots in the month of May or June, which will cause them to throw out new boughs in every part of the tree, as it produces its fruits from the young wood, either of the same, or at the most of the former year's shoots.

Peach trees are often injured by a desire to retain too full a crop on the branches, which not only prevents the present fruit from coming to maturity, but by exhausting the tree, prevents its fruiting in future years. When the peach has attained the size of a small gooseberry, the trees should be carefully thinned, leaving the fruit not nearer than from four to six inches to each other.

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## THE VINE.

(Continued from page 231.)

ALTHOUGH it forms no part of our plan in this work to enter minutely upon the cultivation of trees, we cannot avoid giving a few remarks on a fruit of so much importance.

In the planting of vines, the first care should be to select cuttings of those kinds which are known to be good, and suitable to the situation and soil in which they are to be placed.\*

In regard to the treatment of vines, if they do not succeed, the fault is in the cultivator, not in the vine: it will flourish and prosper under a careful and diligent hand, but it will degenerate and languish under the hand of sloth and idleness. A gentleman of Rome, who took great delight in vineyards, some of which he had raised with his own hands, wrote a very elegant essay on the culture of vines, and in the most pathetic terms recommends it to the people of Italy, as the most profitable as well as agreeable and amusing of occupations. Among many other encouragements, he tells them this story:—

\* In some future number of this work we shall insert a description of the most celebrated vines growing in this country, from which may be selected choice varieties for any part of the Union.

‘Pavidius Veterensis, a neighbor of my uncle, had a vineyard and two daughters. Upon the marriage of one of them, he gave with her as her dowry one-third of his vineyard; and then doubled his diligence, and cultivated the remainder so well that it yielded him as much as the whole had done before: upon the marriage of the other daughter, he gave with her one other third of his vineyard; and now having but one-third of the whole left, he so manured and cultivated it, that it yielded him full as much as the whole had done at first.’

This ingenious author accuses his countrymen of having begun this work with seeming resolution, and of having carried it on for some time with assiduity, but before they had brought it to perfection they abandoned it, and for the want of stability and a little longer perseverance, lost their money, their labor and their prospects. At the same time he proves to a demonstration, from exact and minute calculations, the great advantages of vineyards, notwithstanding the great expense the Romans were at in buildings, inclosures, workmen and magnificent works, and brings his own vineyards, which were well known, as proofs of all he had said.

Gentlemen who prune their own vines should observe, that the fruit is always produced upon the shoots of the same year, which are thrown out of the buds of the last year’s shoots; and that it is not the old wood that yields grapes. It is best to prune vines as soon as the fruit is gathered, as the bearing shoots for the following year cannot be mistaken; and it is recommended to shorten them, so as to leave but four eyes, as by leaving too many the vine is exhausted, and yields but poor, small fruit. The shoots just above the fourth eye are to be cut, and the cutting to be sloped or cut in such a manner that the water discharging from the shoot may not run on the bud to injure it. From the beginning to the middle of May, all vines should be looked over, and the shoots from the old wood should be rubbed off; and if one eye produce two shoots, the weakest must be removed. Vines require frequent examining, after this time, to rub off all dangling shoots; and about the latter end of June or the first of July, the ends of the bearing branches are to be nipped off, but those intended for the next year’s fruit, may grow a month longer before they are topped.\*

\* For particular remarks on the culture and propagation of the vine, see Prince’s Treatise.

The juice of the grape, when subjected to chemical analysis, is found to consist of the following principal ingredients, namely: a considerable portion of water and sugar, extractive matter analogous to mucilage, some tannin, vegetable gelatine, acidulated tartrate of potash, tartrate of lime, phosphate of magnesia, muriate of soda, sulphate of potash, and a particular liquid substance, generally regarded as an elementary constituent on which the fermentative process depends. These, however, are not always found to exist in the same vine; and they vary considerably in different ones. But some of them, such as tartarous acid, sugar, extractive matter, and the liquid substance already referred to, are essentially necessary to fermentation: and it is by possessing these ingredients in proper proportions, that the grape is peculiarly fitted for making wine.

When the grapes are ripe, and the saccharine principle is developed, they are then pressed, and the juice thus obtained, or *must*, as it is called, is received into proper vessels, in which the fermentative process is meant to take place. When the must is exposed to a temperature of 65° F. it speedily begins to ferment: small bubbles first collect on the top, and may be seen gradually issuing from the central parts of the liquor, and bringing up the husks, stones, and other grosser matters which it contains. As the disengagement of gas proceeds, a hissing noise is produced by the bursting of the bubbles; and a frothy crust or scum is formed by the viscid particles which they have carried to the surface. An increase of the temperature and bulk of the fermenting mass now takes place: the must loses its original consistency, and its saccharine taste, acquiring a deeper color and a vinous flavor, with an odor of spirit of wine, which becomes more perceptible as the process advances. At length these commotions of the fluid abate spontaneously; and, after a few hours' rapid fermentation, the ebullition ceases altogether, the mass subsides to its former bulk, and the crust and solid particles which disturbed the transparency of the liquor, are precipitated to the bottom of the vessel.

In order to insure a regular and complete fermentation, it is necessary that the grapes should be all equally trodden, and that the vat which is to contain them, should be filled as speedily as possible, within twenty-four hours at farthest.

Fermentation proceeds with incredible rapidity, insomuch that the juice, as it flows from the grape, will often work and ferment before it arrives at the vat; owing to the pressure and

motion to which, when being carried from the vineyard, it has been subjected. The most favorable temperature, as already stated, is 65° F. Below that degree fermentation is languid; above, it is violent; and when very high or very low, it ceases altogether. When the process has commenced, however, the temperature quickly rises, even so high as 30° above the point in question. Another circumstance necessary to fermentation is contact with the external air: without this, indeed, no fermentation can take place; but after the process has been established, such contact is not necessary. Finally, fermentation is brisk in proportion to the extent of the fermenting mass. In a cask it proceeds more slowly than in a vat: in short, the preference is to be given to large vessels. It may here be mentioned that when, from the deficiency or inactivity of the ingredients necessary to fermentation, that process does not go on successfully, means must be used to supply the defect. If, for example, the must is too thin and watery, and fermentation proceeds with difficulty, the objection may be removed by boiling the must and allowing the superabundant water to evaporate; by merely throwing in a portion of must which has been thus thickened; or by adding a quantity of sugar, as is the common practice in cold climates where the grapes seldom reach their full maturity. In some places baked gypsum is used, in order to absorb the excess of humidity; in others, the grapes are partially dried before trodden. The addition of tartar accelerates fermentation, particularly if the grapes abound in the saccharine principle. The stalks of the grapes when added to the mash, act as a powerful leaven, and augment the strength of the wine; but to the weaker sort, they are apt to communicate a harsh and austere flavor, owing to the tannin and extractive matter which they contain. In case of Port, they are always used; while in the manufacture of the more delicate red wines of Bordeaux, they are generally excluded. For the white wines of the same district, however, they are thought to be advantageous, rendering them less apt to spoil. Yet the wines of the Rhine, which are distinguished by their great durability, are not fermented with the stalks, and probably would not bear the addition. It is chiefly when the saccharine principle predominates that they contribute to the strength of the wine. The exact time required to complete fermentation varies, being dependent on the quality of the grapes and of the wine sought to be obtained. Weak wines require but a short time; the lighter wines, in truth, will not bear the vat longer than twenty-four or thirty hours. If a brisk wine be wished,

the contents of the vat must be drawn out into casks before the fermentation subsides. In general, the process may be regarded as terminated, when the saccharine flavor of the must has disappeared, and the liquor has acquired a distinct vinous taste.

One of the principal results of the process of fermentation, is the production of alcohol or spirit of wine, effected by the decomposition of the sugar, and the separation of the mucilaginous extractive matter of the must in the form of lees. The alcohol may be separated in a pure state by distillation; of which latter process, we may here remark, the ancients seem to have been entirely ignorant. Different kinds of wine yield very different qualities of alcohol; the strong wines of the south, particularly those of Spain and Languedoc, yield the most, namely, one-third of proof spirits.

In transferring the wine from the vat to the cask, it undergoes a new process, which renders it again turbid, and generates the phenomena that marked the former action. A portion of the sugar, though the taste of it has nearly disappeared, remains undecomposed; and this being acted upon by the mucilaginous extractive matter which still exists in solution, a disengagement of carbonic acid gas, and a fresh deposit of sediment will be the result. These movements become by degrees less perceptible, but still there goes on an invisible fermentation, as it is called, which, particularly in the case of the stronger wines, will continue for many years, during which they become much ameliorated. A portion of the coloring matter and tartar is precipitated: the liquor loses its harshness, and the aroma and flavor that are peculiar to it become more apparent. These changes may be accelerated by various artificial methods, especially by the agitation of the lees, which always contain a quantity of fermentative matter, and by the assistance of heat. Hence the reason why certain strong and austere wines are so much improved and mellowed by being exported on the lees to a warm climate, while the lighter and more delicate wines are generally injured by being made to undergo a similar process, or even by the motion occasioned by the removal of them to any considerable distance.

The next step, when wine has attained a sufficient degree of maturity, is to free it from the lees by being racked, as it is termed, into a clean cask; and in order to prevent a renewal of fermentation, it is subjected to the operation of *sulphuring*. This process is generally performed by means of sulphur matches applied to the cask into which the wine is to be



racked. Should the fermentation still continue, this application is renewed as often as may be necessary. Sometimes must, strongly impregnated with sulphurous acid gas, is added to the wine, which answers the same purpose as the other mode. After sulphuring, the greater proportion of wines require to be farther clarified, or *fined*, before they attain a due brightness. For this purpose various substances are used, which by their chemical or mechanical action, unite with such materials as disturb the purity of the wine, and precipitate them to the bottom. The substances in general use are isinglass and the white of eggs, but as these, particularly in warm climates, are of a putrescent nature, gum arabic has been used instead of them. In Spain, the white wines are sometimes clarified with fullers' earth. Powdered marble, gypsum, heated flints, beech wood chips, and a variety of other things are used for the same purpose. The quantity, however, of any of these substances used is very small: one ounce of isinglass, for example, is sufficient for a hundred gallons of wine. Brandy is sometimes mixed with wine, and different wines are frequently mixed with each other: processes which require great attention and nicety.

With regard to the flavor and the color of wines, we may state that neither of these two qualities are inherent to a very great degree in any kind of grapes, with a very few exceptions, but that they are artificially communicated to the wines by the manufacturer. These results are obtained in various ways, some of which continue a secret. Its flavor, however, is often generated by the application of bitter almonds, oak chips, orris root, wormwood, &c. while color is the result of the use of logwood, Brazil wood, elder berry, oak chips, iron, &c. Both processes, to succeed, require to be managed with particular delicacy and skill.

Such are a few general remarks on the nature of the process by which wine-making is conducted. There are some minute differences in the manufacture of the various species of wine, but of these we have not room, nor is it necessary to give a particular account. The general principle which we have been analyzing, may be regarded as the foundation of a process, of which the varieties are endless.

That an excess of this reviving beverage is pernicious to health, no one will attempt to deny, any more than he would to excuse repeated intoxication. Wine is not so much used in this age to debase man as it was in times past. Those liquors least intoxicating are now preferred; and the quality of the wines given at table is at present more attended to

than the quantity ; which has introduced cheerfulness and good sense around the decanters, in exchange for boasting disputes. In an age that has advanced so far towards refinement, there can be no need to set up the alarm of poison, or condemn all the wine merchants as murderers, as has lately become the fashion of some authors, which can answer no other purpose than that of alarming the timid, and bringing a respectable body of men into contempt, because a few paltry dealers have been detected in the infamous practice of adulterating their wines with poisonous drugs. That the adulterating of wines is a general practice among wine merchants is infallibly incorrect, and can be refuted by the best of all possible arguments, viz : it is against the interest of the wine merchant to do so ; for he has more difficulty in procuring superior wines than he has of obtaining ready sales at high prices. The best wines are always the first sold, and afford the largest profit, whereas inferior wines are rarely disposed of without a loss. When the vintage proves rather unfavorable, or his importations are deficient in flavor, he pursues a very different course than adulteration : he is obliged to procure the richest wines he can obtain of the same kind to mix with them. This is often done at a great expense, because he has not the means of disposing of inferior wines, even at any price. It is not an uncommon practice to add Burgundy or Hermitage to improve Port wine : this cannot be deemed adulteration.

We will allow that it is the practice of some wine dealers to adulterate bad wine to conceal its defects : if, for instance, the wine be sour, they throw into it a quantity of sugar of lead, which entirely takes away the sour taste. For similar purposes alum is often mixed with wine. Such substances, however, are well known to be extremely pernicious to the human constitution ; it becomes of importance, therefore, to be able to detect them whenever they happen to be contained in wine. Several chemists who have turned their attention to this subject, have furnished us with tests for this purpose.

To discover lead dissolved in wine, boil together in a pint of water an ounce of quicklime and half an ounce of flour of brimstone ; and when the liquor, which will be of a yellow color, is cold, pour it into a bottle, and cork it up for use. A few drops of this liquor being dropped into a glass of wine or cider containing *lead*, will change the whole into a color more or less *brown*, according to the quantity of lead which it contains. If the wine be wholly free from lead, it will be rendered turbid by the liquor, but the color will be rather a

dirty white than a black brown. By this test, however, iron is also precipitated when dissolved in wine, and is apt to be taken for lead. The following test is therefore preferable, as not liable to the same inconvenience.

Take equal parts of calcined oyster shells and crude sulphur in powder, and put them into a crucible, which put into a fire, and raise the heat suddenly till it has been exposed to a white heat for fifteen minutes. Then take it out, let it cool, beat the ingredients to powder, and put them into a well-corked bottle. To prepare the test liquor, take twenty grains of this powder, together with one hundred and twenty grains of cream of tartar, and put them into a strong bottle, fill it up with water, boil it for an hour, and let it cool. Cork the bottle immediately, and shake it from time to time. After some hours' repose, decant off the clear liquor into an ounce vial, having first put twenty-two drops of muriatic acid into each vial. Cork these vials accurately with a little wax mixed up with a little turpentine. One part of this liquor, mixed with three parts of suspected wine, will discover the presence of the smallest quantity of lead or copper, by a very sensible, black precipitate, and of arsenic by an orange precipitate: but will have no effect on iron, if there be any; the presence of which, however, may be ascertained by adding a little potash, which will turn the liquor black if there be any iron. Pure wine remains limpid on the addition of this liquor.

As a high color is generally, though sometimes erroneously, considered a criterion of the excellence of particular wines, and as the vintages of unfavorable seasons are almost always deficient in this particular, it is frequently supplied by artificial means. For this purpose a variety of coloring matters are employed, such as the elder berry, wortle berry, privet, beet root, tounesol, (*Croton tinctorium*,) logwood, Brazil wood, &c.; all of which, though they may improve the tint, deteriorate the flavor and durability of the wine. The color imparted by such materials, however, is seldom a pure red, but approaches more to violet, unless when heightened with alum; and the fraud is apt to betray itself, by the flat and herbaceous taste which the liquor acquires. According to Cadet, this species of adulteration may be always detected by pouring into the suspected wine a solution of sulphate of alumina, and precipitating the alum by potash. If the wine be pure, the precipitate will have a bottle green color, more or less dark, according to the natural hue of the wine. Thus the wines of Roussillon and Languedoc exhibit a dark green; those of Burgundy a bright green; and the *vins de pays* a

green approaching to gray. If, again, the coloring has been artificial, the following will be the results :—

Tournefol	will give a precipitate of a bright violet color.
Brazil wood	. . . . . a brownish red color.
Elder berries, or privet	. . . . . a brownish violet color.
Wortle berries	. . . . . the color of dirty wine lees.
Logwood	. . . . . a lake red color.

Though the various sophistications, by means of heterogeneous ingredients, are not all equally reprehensible, it is very certain that none of them is calculated to supply or improve the qualities of genuine wine. Even the communication of artificial flavors derived from fruits and aromatic herbs, which is the most innocent of any, is apt to infect the liquor with a medicated taste, which to a delicate palate is immediately perceptible. The only legitimate mode of bettering wines is by the addition of such constituents of the grape as the deficiencies of particular vintages appear to indicate; and they ought to be employed as much as possible during the fermentation, or before the wine is completely formed. To certain kinds, intended for distant climates, the admixture of a small quantity of brandy may be allowable, but never to such an extent as to overcome the original flavor; otherwise we impair their excellence, and risk their partial decomposition. In general, however, it may be observed, that the necessity for all these expedients will diminish as the culture of the vine improves, and as more skilful methods are adopted in the treatment of its produce. We will grant that—*Prevention is better than cure*; but in wine-making, as in other arts, this maxim is too much neglected.

Grapes furnish the French with a very valuable article of commerce, almost equal in importance to their wines, namely, brandy. The kinds imported into this country are principally from Bordeaux, Rochelle and Cogniac; but they are very inferior to those made in the neighborhood of Nantes and Poictou, from which private families in the city and suburbs of Paris supply themselves, and they are very careful to obtain the best quality of this spirit. All brandies are originally white, but by long keeping they naturally become a little stained by the cask; and to give this appearance of age to the brandies, burnt sugar and other dyes are sometimes added to such an excess as to destroy the natural flavor of the spirit. In order, therefore, to obtain brandy that has not been injured in this way, the pale kind should be taken.

Our fruiterers have a considerable trade in preserved grapes, which are principally brought from Europe in large earthen

jars, closely cemented down ; although considerable quantities of American grapes are preserved in the same manner : these grapes add considerably to the luxury of our winter deserts, as they are sold at moderate prices for so rare a fruit.

This art of preserving grapes was well known to the Romans. Columella gives a particular account of the manner they were preserved, both in his time and in the time of his uncle, Marcus Columella. He recommends them to be put into small jars that will contain only one bunch, and that the fruit should be quite dry when the sun is on it, and after being cooled in the shade, to be suspended in jars, and the vacua to be filled up with oat chaff, after all the dust has been blown from it. The jars must be well baked or burnt, and not such as imbibe moisture : the tops of the jars must be covered over, and pitched, to keep out the air.

Laborde, in his account of Spain, gives the following description of the mode of drying raisins :—‘ In the kingdom of Valencia they make a kind of lie with the ashes of rosemary and vine branches, to which they add a quart of slack lime. This lie is heated, and a vessel full of holes containing the grapes is put into it. When the bunches are in the state desired, they are generally carried to naked rocks, where they are spread on beds of the field artemisia, and are turned every two or three days till they are dry. In the kingdom of Granada, particularly towards Malaga, they are simply dried in the sun, without any other preparation. The former have a more pleasing rind, but a less mellow substance ; the skins of the latter are not so sugary, but their substance has a much greater relish ; therefore, the raisins of Malaga are preferred by foreigners, and are sold at a higher price : to this their quality may likewise contribute ; they are naturally larger and more delicate than those of the kingdom of Valencia.’

The leaves of the vine make an excellent substitute for tea. By being cut small, bruised, and put into a vat or mashing tub, and boiling water poured on them in the same way as is done with malt, the prunings of the vine produce liquor of a fine vinous quality, which, on being fermented, makes a very fine beverage, either strong or weak as you please ; and on being distilled, produces an excellent spirit of the nature of brandy.

The expressed juice of the unripe fruit is called verjuice, and is considered a very useful external remedy for bruises.

The wood of the vine, reduced to charcoal, is used by painters for drawing outlines, and is mentioned as good for tooth powder.

## LEAD.

CLASS—*Metallic*, comprising metals. GENUS—*Plumbum*, comprising lead.

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LEAD is generally found mineralized with sulphur, in an ore called galena. It is found more or less in all countries; but it is rare, however, in the Ural Mountains and in Peru, although other metals are abundant.

It is found in great quantities in Great Britain, and especially in England and the Lead Hills of Scotland. The mines of the rest of Europe, chiefly found in Germany, France and Spain, produce less than those of Great Britain alone.

The United States contain several extensive beds of lead ore. The mine at Southampton, Mass. is the principal now wrought east of the Mississippi. Lead is found, however, on the Schuylkill river—on the Great Kenhawa—at Middletown, Conn.—and in most of the states comprised in the primary and secondary regions.

The lead mines of Missouri, lying near the Mississippi river, are among the richest in the world. The ore is found abundantly within two feet of the surface, in detached masses weighing from 1 to 1800 pounds. The annual produce is estimated at 3,000,000 pounds.

Dubuques Lead Mines, on the Mississippi, have been wrought until recently by the Indians, who sold the ore to the whites; and have produced about 30 or 40,000 pounds annually.

The great lead mines of the Huron country have been worked only about three years, by comparatively few persons, under every possible disadvantage, and almost 30,000,000 pounds of lead have been made there. The mineral used by the miners is a sulphuret of lead yielding from 56 to 87 per cent. of pure lead. It is found in veins invariably running from north to south, or from east to west. There is one vein twenty rods long and sixty feet wide, and extending downwards to an unknown depth, which is filled with ore that is nearly pure lead.

The lead occupies about one hundred miles square of surface, except about twenty miles by four or five of copper ore, included within the aforesaid one hundred miles square. 30,000,000 pounds of lead have been made in the min-



eral region, and not more than one mile square of surface has been opened for ore. Without opening a new mine, 30,000,000 pounds more of lead might be made there.

Lead is of a bluish white color, very brilliant when first cut with a knife, but it soon tarnishes by exposure to the air; it will mark writing paper, though in a fainter manner than plumbago. It is malleable and ductile, but possesses very little tenacity. It becomes fusible in a temperature of  $612^{\circ}$  F. above zero, and is 11.35 times heavier than water. It is much used in the arts in the metallic state. It is alloyed with tin forming pewter. Good pewter consists of one part lead to four of tin; but most of the pewter of the present day is chiefly lead. Solder, called plumbers' solder, consists of equal parts of lead and tin melted together. Lead may be mixed with gold and silver in a moderate heat, but when the heat is much increased, the lead rises to the surface, combined with all heterogeneous matters. Upon this property of lead, is built the art of refining the precious metals.

The ore of lead is so poisonous that the steam arising from the furnaces where it is worked, infects the grass in all the neighboring places, and kills the animals which feed upon it. Culinary vessels, lined with a mixture of tin and lead, which is the usual tinning, are apt to communicate to acid foods pernicious qualities, and require to be used with great caution. The same may be said of liquids, acids kept in glazed ware, and wines adulterated with litharge, and such other preparations of lead as are sometimes used for the purpose of rendering them sweet.

*Lead receives its lowest proportion of oxygen at a low red heat, while exposed to atmospheric air; also from the decomposition of an acid, with which it is combined as the base of a salt.*

ILLUSTRATION. Melt some lead in a ladle, and scrape off the pellicle which forms on its surface several times, or until a sufficient quantity is obtained. Part of this is oxidated, and part is not. Then put this into the ladle by itself and expose it to a low red heat, continually stirring it with a rod until it becomes of a yellow color. This is the protoxid, yellow oxid, or *massicot*.

Or it may be obtained by forming the nitrate of lead in the same manner as directed for forming the nitrate of mercury, and then by heating the salt to redness in a ladle, covered over pretty closely; the acid is driven out, leaving the protoxid of lead.

**APPLICATION.** This is the massicot used in the arts. It is also a useful powder for setting a fine edge to razors, for polishing burnishers, &c.

*The protoxid of lead will become the deutoxid, by exposing it to atmospheric air in a strong heat, not quite bringing the powder to a state of fusion.*

**ILLUSTRATION.** Put some massicot into a ladle, and cover it over loosely with an earthen or iron plate, and raise the heat. Raise up one end of the plate and stir it often, until it becomes a bright red. Care must be taken not to raise the heat so high as to drive off the previously acquired oxygen, and thereby bring it again to the state of pure melted lead. It is in fact difficult to perform this operation with small quantities.

**APPLICATION.** This is *red lead* or *minium*, used by painters. On this principle, though with very different apparatus, red lead is manufactured for the shops. But the red lead of the shops is generally very impure. It often contains red ochre, silix, alumina, muriate of lead, sulphate of lead, &c.

*Carbonate of lead, called white lead, is formed by double decomposition on mixing nitrate of lead and pearlash.*

**ILLUSTRATION.** Make nitrate of lead as before directed, and dissolve it in water in a wine glass. Pour into it a solution of pearlash, and a white insoluble precipitate will fall down. Let the liquid be poured off, and the powder washed several times.

**APPLICATION.** This is the *white lead* of painters in its purest state. It is generally made in the large way by applying the vapor of vinegar to sheet lead. It will of course contain some acetate of lead and other impurities.

*White lead, carbonate of lead, dissolved in vinegar, forms sugar of lead.*

**ILLUSTRATION.** Put some white lead into a Florence flask. Put in about ten times as much good sharp vinegar, (distilled vinegar is best.) Shake it up several times and let it stand until the vinegar tastes sweet. Add more vinegar and continue adding by small quantities until it will remain sour. Evaporate and chrystalize in the usual way.

**APPLICATION.** This is the acetate of lead, or sugar of lead, used in medicine. It is called sugar of lead on account of its sweet taste.





NIGHT HAWK.

